Schultz & Associates, P.C.
INTELLECTUAL PROPERTY ATTORNEYS

O I P E
FEB 1 5 2007
PATENT & TRADEMARK OFFICE

February 12, 2007

Mail Stop APPEAL
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Re: U. S. Patent Application Serial No. 10/719,267
"Production of Olefins"
Atty. Docket: F-756 CON (31223.00020)

Sir:

Enclosed for filing are the following documents:

1. Response to Notification of Non-Compliant Appeal Brief (with certificate of mailing);
2. Amended Appeal Brief (with certificate of mailing);
3. Transmittal letter (in duplicate); and
4. A postcard receipt.

We do not believe that any fees are required for the filing of this amendment. However, in the event that any fees are required, the Commissioner is hereby authorized to charge such fees to Deposit Account No. 50-2225.

Sincerely,

William D. Jackson

WDJ/slc
Enclosures

One Lincoln Centre ▵ 5400 LBJ Freeway, Suite 1200 ▵ Dallas, Texas 75240
214.210.5940 ▵ Fax 214.210.5941 ▵ www.texas-patent-law.com

Schultz & Associates, P.C.
INTELLECTUAL PROPERTY ATTORNEYS

OIPE IAP2
FEB 15 2007
PATENT & TRADEMARK OFFICE

February 12, 2007

Mail Stop APPEAL
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Re: U. S. Patent Application Serial No. 10/719,267
"Production of Olefins"
Atty. Docket: F-756 CON (31223.00020)

Sir:

Enclosed for filing are the following documents:

1. Response to Notification of Non-Compliant Appeal Brief (with certificate of mailing);
2. Amended Appeal Brief (with certificate of mailing);
3. Transmittal letter (in duplicate); and
4. A postcard receipt.

We do not believe that any fees are required for the filing of this amendment. However, in the event that any fees are required, the Commissioner is hereby authorized to charge such fees to Deposit Account No. 50-2225.

Sincerely,

William D. Jackson

WDJ/slc
Enclosures

One Lincoln Centre ▲ 5400 LBJ Freeway, Suite 1200 ▲ Dallas, Texas 75240
214.210.5940 ▲ Fax 214.210.5941 ▲ www.texas-patent-law.com

31223.00020
(F-756CON)

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:	Jean-Pierre Dath et al.	Confirmation No.: 2790
Serial Number:	10/719,267	
Filing Date:	November 21, 2003	
Title:	Production of Olefins	
Group Art Unit:	1764	
Examiner:	Thuan D. Dang	
Customer Number:	25264	

Mail Stop APPEAL BRIEF
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

First Class Certificate of Mailing

I hereby certify that the papers enclosed herein are being deposited with the United States Postal Service, via first class mail with sufficient postage, in an envelope addressed to: Mail Stop APPEAL BRIEF, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450:

Sherry Colgrove — February 12, 2007
Sherry Colgrove — Date of Deposit

Sir:

Response to Notification of Non-Compliant Appeal Brief

In response to the Notification of Non-Compliant Appeal Brief dated January 10, 2007, submitted herewith is an Amended Appeal Brief containing the omissions identified in the Notice. The evidence relied upon by the Examiner in rejecting the claims was submitted with the Evidence Appendix in the previously filed Appeal Brief. Also we understand from a telephone conversation

with Appeal Center Specialist Timothy Cole on January 24, 2007 that it is not necessary to again submit copies of the Decisions on Appeal included in the previously filed Appeal Brief with the Related Proceedings Appendix or the references included in the Evidence Appendix.

Respectfully submitted,

William D. Jackson
Registration No. 20,846

January 24, 2007

Schultz & Associates, P.C.
One Lincoln Centre
5400 LBJ Freeway, Suite 1200
Dallas, Texas 75240
Telephone: 214/210-5940
Fax: 214/210-5941

31223.00020
(F-756CON)

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:	Jean-Pierre Dath et al.	Confirmation No.: 2790
Serial Number:	10/719,267	
Filing Date:	November 21, 2003	
Title:	Production of Olefins	
Group Art Unit:	1764	
Examiner:	Thuan D. Dang	
Customer Number:	25264	

Mail Stop APPEAL BRIEF
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

First Class Certificate of Mailing

I hereby certify that the papers enclosed herein are being deposited with the United States Postal Service, via first class mail with sufficient postage, in an envelope addressed to: Mail Stop APPEAL BRIEF, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450:

Sherry Colgrove
Sherry Colgrove — February 12, 2007
Date of Deposit

Sir:

AMENDED APPEAL BRIEF

This is an appeal from the decision of the Primary Examiner in the Final Rejection dated April 14, 2006, finally rejecting claims 1 – 3, 5 – 14 and 16 – 35.

Real Party in Interest

The real party in interest is Total Petrochemicals Research Feluy, successor in name to Fina Research, S.A., a Delaware corporation, as recorded by the assignment filed August 2, 2000.

Related Appeals and Interferences

Parent Application Serial No. 09/594,059 was the subject of an appeal as noted below. Commonly-assigned applications having the same inventive entity as this application and directed to catalytic cracking processes were the subject of appeals as indicated below.

Application Serial No. 09/594,059 Abandoned

Application Serial No. 09/206,210; now Patent No. 6,713,658
Application Serial No. 09/205,559, Abandoned
Application Serial No. 09/206,207; now Patent No. 6,645,175
Application Serial No. 09/206,208; now Patent No. 6,646,176
Application Serial No. 09/206,218; now Patent No. 6,951,968
Application Serial No. 09/206,216; now Patent No. 7,087,155

Application Serial No. 09/596,356, Abandoned

Copies of the Decisions in the aforementioned appeals are attached in the Related Proceedings Appendix.

Status of Claims

The claims pending in this application are 1 – 3, 5 – 14 and 16 – 35. Claims 1 – 3, 5 – 14 and 16 – 35 are appealed and are reproduced in the Claims Appendix. Claims 4 and 15 have been cancelled. No claim is allowed.

Status of Amendments

No amendment has been filed subsequent to the final rejection.

Summary of Claimed Subject Matter

The invention called for in the claims on appeal involves, in its simplest embodiment, the cracking of an olefin-rich hydrocarbon feedstock containing 10 – 100 weight percent olefins in the presence of hydrogen which is added to the feedstock to produce a product having a similar overall olefin content, within ± 15% of the olefin content of the feedstock, but a different olefin distribution (p. 11, ln. 30 through p. 12, ln. 17). The feedstock is supplied along with hydrogen added to the feedstock to a reactor containing a crystalline silicate catalyst to cause cracking of the feedstock olefins to produce lighter (lower molecular weight) olefins. (Independent claim 1) The catalyst is preferably a crystalline silicate of the MFI family (p. 14, lines 31-35). The MFI crystalline silicates are described in terms of crystal structure and silica/alumina ratios in the specification at page 15, line 1, through page 18, line 1. Preferred MFI silicates are silicalite having silica ratios of 300-500 or more specifically 300-480 (page 15, lines 24-25; page 17, line 34, through page 18, line 1).

The hydrogen is added to the olefin rich feedstock prior to supplying the feedstock to the reaction zone at a hydrogen partial pressure of not more than 7.5 bar (p. 13, lns. 2-25) (Independent Claims 23 and 31). The reaction zone is operated at temperature and pressure conditions effective to cause cracking of the olefins in the feedstock to produce olefins which are lighter than olefins in the feedstock to provide an effluent which has an olefin content by molecular weight within the range plus or minus 15 % of the olefin content of the feedstock and has a lower molecular weight than that of the olefin content of the feedstock (Independent claims 23 and 31). The propylene yield is within the range of 30-50 weight % of the total olefin content of the feedstock (Dependent Claim 14, Independent Claim 31).

The hydrogen added to the feedstock functions to retard the formation of dienes which would lead to the formation of coke resulting in deactivation of the catalysts with an increase in the

cycle time between successive catalyst regenerations (p. 9, lines 11-35). The effluent from the reactor preferably contains propylene in an amount within the range of 30-50 wt.% of the total olefin content of the feedstock (p. 16, lines 27-33). The presence of hydrogen, in addition to substantially increasing the cycle time between successive regenerations, also controls the amount of propylene relative to the total C_3 species present. Thus, at low hydrogen partial pressures of up to 5 bar, the propylene purity is high. (Dependent claims 3 and 4) At a high hydrogen partial pressure, such as 15 bar, the propylene purity is poor. (p. 23, lines 29-35). Desirably, the hydrogen partial pressure is limited to no more than 7.5 bar. (p. 23, line 22 – p. 24, line 6)

The diene content in the feed stream to the cracking reactor can be limited to a maximum of 0.1 wt.% through a preliminary hydrogenation process. (page 25, lines 11-15) (Dependent claim 21) This is shown in Figure 1 and the description found in the specification at pages 24-25. The olefin-rich feedstock is supplied through heat exchangers 18 and 8 to cracking reactors 4 and 6. Hydrogen is supplied through an inlet 16 to cause selective hydrogenation of dienes in the hydrogenation reactor 20 to arrive at the requisite low diene content. Olefins are recovered through fractionation columns 26-30 shown in Figure 1, as described at page 25, lines 16-23.

In a preferred embodiment of the invention, ethylene is added to the feedstock containing C_{4+} olefins prior to introducing the feedstock into the cracking reactor. (Dependent claims 6, 26 and 28) This may be coupled with the introduction of C_{5+} olefins to the feedstock. (Dependent claim 27) This mode of operation is shown in Figure 5 and described in the specification at page 29, line 24 to page 31, line 8. As shown in Figure 5, the feed stream with hydrogen added is supplied to cracking reactors 54 and 56. The output is supplied to a separator 72 which takes C_{2-} hydrocarbons, including ethylene, and hydrogen overhead with the C_{3+} hydrocarbons withdrawn via line 84. The overheads, after a purge to remove methane and ethane, are supplied to a compressor 78, the output

of which, including hydrogen and ethylene, is recycled to the feedstock via line 80. (Dependent claims 5, 7, and 28) C_{5+} hydrocarbons, including paraffins and olefins, are withdrawn from a separation system via line 96. After removal of some of the C_{5+} species including paraffins, C_5 olefins are supplied to the feed stream via line 100. (Dependent claim 28)

Grounds of Rejection to be Reviewed on Appeal

The grounds of rejection presented are:

Claims 1 – 3, 5, 12, 13, 16 – 25 and 30 under 35 USC 103(a) as obvious over EP344,444 to Haag et al.

Claims 6 – 11, 14, and 26 – 29 and 31 – 35 as unpatentable under 35 U.S.C. § 103(a) over Haag et al in view of EP109,060 to Colombo et al.

Appellants' Arguments

As noted previously under Related Appeals and Interferences, the parent application Serial No. 09/594,059 was the subject of an appeal to the Board of Patent Appeals and Interferences. As indicated in the Decision on Appeal in Serial No. 09/594,059 submitted in the Related Proceedings Index, two of the rejections involved there, based upon Haag under 35 USC 103, or Haag in view of Colombo under 35 USC 103 were affirmed in the Board's Decision. The claims on appeal here are substantially different from those considered in parent application Serial No. 09/594,059. The claims here specify that the feedstock supplied to the catalyst contains 10 – 100 weight percent olefins and further recites that hydrogen is added to the olefin feedstock prior to the contact of the feedstock with the catalyst in the reaction zone.

To the extent that the arguments presented below are similar to those made in the appeal of parent application Serial No. 09/594,059, the specific recitation of a minimum of olefin content of 10 weight percent (or 50 weight percent in claims 22, 30 and 35) together with the specific recitation of adding hydrogen to the feedstock prior to introducing the feedstock into the

reaction zone, frames the issues of obviousness in a substantially different manner than those issues considered in the previous appeal.

In the arguments presented in this Brief, the claims do not stand or fall together. In addition to the arguments applicable to all of the claims rejected over Haag, additional arguments are presented separately with respect to claims 2, 3, 23, and 24; claim 5; claims 16 and 17; claim 21; and claims 22 and 25.

With respect to the claims rejected under 35 U.S.C. § 103 over Haag in view of Columbo, in addition to arguments applicable to all of these claims, additional arguments are presented separately for claims 6, 8, and 26; claims 7 and 28; claim 14; claims 9 and 27; claim 29; claims 31-33, and claim 35.

The rejection of claims 1 – 3, 5, 12, 13, 16 – 25 and 30
<u>under 35 USC 103(a)as obvious over Haag et al. (EP0034444)</u>

A requirement in all of the claims on appeal is that hydrogen is supplied to the reaction zone by incorporating the hydrogen into the feedstock prior to introduction of the feedstock into the reaction zone. As discussed below, the patent to Haag does not disclose the cracking of an olefin-rich feedstock in the presence of hydrogen to enhance the stability of the catalyst as involved in appellants' invention. Further, the reference in Haag to hydrocracking does not import into Haag a disclosure of the cracking of olefins in the presence of hydrogen for any purpose. However, even if one were to assume the contrary, it is evident that there is no disclosure in Haag of introducing hydrogen into an olefin-rich feedstock prior to contact of an olefin-rich feedstock with the catalyst. The hydrocracking referred to in Haag would not involve an olefin-rich feedstock of any character, but even if the contrary were to be assumed, there

would be no reason, following the teachings of Haag, to introduce hydrogen into the feedstock prior to supply of the feedstock to the reaction zone and into contact with the catalyst.

Assuming that the Haag process were to involve the introduction of hydrogen into the reaction zone, as specifically acknowledged on page 2 of the Final Rejection, Haag is silent as to how or why the hydrogen is added to the reaction zone. If we are to assume that the Haag process involves the addition of hydrogen to the reaction zone containing an olefin-rich feedstock, and this is not found in the Haag reference itself but only in the analysis by the Examiner of what Haag means by the hydrocracking of petroleum products, there is no teaching in Haag of adding the hydrogen to the feedstock prior to supplying the feedstock to the reaction zone.

Common to the rejection of all of the claims in this case, whether based upon Haag alone or Haag in view of Colombo, is the Examiner's position that the reference in Haag to "hydrocracking" involves the cracking of olefins in the presence of hydrogen. The Haag reference contains no such disclosure. Haag is directed to a process for contacting a zeolite catalyst with water in order to enhance its activity. As disclosed in Haag in the abstract and in pages 21-24, the enhanced activity zeolites can be employed in hydrocarbon conversion processes including cracking, hydrocracking, alkylation, dealkylation, transalkylation, isomerization, dimerization, oligomerization, polymerization, disproportionation, and aromatization. Haag does not disclose the cracking of an olefin-rich feedstock in the presence of hydrogen to produce a lower molecular weight effluent while enhancing the stability of the catalyst. Recognizing this deficiency in Haag, the Final Rejection relies upon the disclosure in Haag of "hydrocracking" as amounting to a disclosure of the cracking of olefins in the presence of hydrogen. However, this interpretation of Haag is not consistent with what one of ordinary

skill in the art would understand to be a hydrocracking process. The term "hydrocracking" is commonly understood to be the cracking of petroleum or petroleum products in the presence of hydrogen. Petroleum and petroleum products do not involve material amounts of olefins but are understood by those skilled in the art to involve paraffinic (paraffins and cyloparaffins) and aromatic hydrocarbons. While olefins can be derived from petroleum fractions by refining operations, for example, by conversion of alkanes originally found in petroleum to alkenes, they are not typically present in petroleum or petroleum fractions which are commonly understood to be the feedstock in a hydrocracking procedure. Moreover, even if minor amounts of olefins were to be involved, they would not normally be present in an amount of 10 wt.% or more. Thus, the reference in Haag to "hydrocracking" would not denote to one of ordinary skill in the art the cracking of an olefin-rich hydrocarbon feedstock containing 10 – 100 wt.% olefins as required in the claims. It is again emphasized that hydrocracking processes, as they are understood by those skilled in the art, do not involve the cracking of an olefin-rich feedstock. Far from being rich in olefins, the feedstocks commonly employed in hydrocracking procedures typically involve feedstocks or petroleum fractions, which simply do not involve olefins, much less involving olefin-rich feedstocks having 10 wt.% or more of olefins, or in the case of claims 22, 30 and 35 at least 50 weight percent olefins.

Haag does not disclose the cracking of an olefin-rich feedstock to which hydrogen has been added over a zeolite catalyst to produce a lower molecular weight effluent. Further, Haag fails to disclose that the effluent and the feedstock have olefin contents within the range of ±15% as recited in all of the claims on appeal. To the extent that the rejection is based upon a presumption that these features or other features called for in applicants' claims are inherent in or must be found in Haag, applicants would respectfully submit that the Examiner has not

established any basis for such a presumption. First of all, Haag, as noted above, discloses a wide variety of processes. While hydrogen may be present in some processes (generally Haag refers to hydrogen/hydrocarbon ratios varying from 0, *i.e.* no hydrogen, up to about 20), Haag does not disclose the use of hydrogen in conjunction with the cracking of olefins to lower molecular weight olefins. In fact, the only disclosure of the use of hydrogen in conjunction with olefins appears to be in conjunction with olefin polymerization (the first full paragraph of page 22) or olefin or paraffin aromatization (the paragraph bridging pages 22 and 23). Other processes in which hydrogen may be present involve hydrocracking, isomerization, and disproportionation. These processes obviously do not involve the cracking of higher molecular weight olefins to lower molecular weight olefins. As noticed previously, the term "hydrocracking," as commonly used and as used in the Haag reference, does not involve in any fashion the cracking of an olefin-rich hydrocarbon feedstock in the presence of hydrogen. Further, there is nothing in Haag which would even remotely suggest the use of hydrogen to enhance the stability of the catalyst.

The Final Rejection is in error in its assertion in page 2 that Haag discloses cracking of an olefinic feedstock in the presence of hydrogen in the Abstract or in the material at page 20, line 22, through page 21, line 17, and page 23, line 5 – 26. The abstract simply refers to the main thrust of the Haag disclosure, the use of water to increase catalytic activity, and then concludes with a laundry list of conversion processes as noted previously. The first portion of this material, page 20, line 22, through page 21, line 11, is not concerned with an olefin cracking procedure. This paragraph appears generally to relate to acid-catalyzed hydrocarbon conversion processes. Beyond this, it is impossible to tell what conversion reactions are referred to here, but at least insofar as olefins are concerned, since the only reference in Haag to the use of hydrogen in connection with olefins is in polymerization or aromatization, it is clear that this material is not

applicable to an olefin cracking process. The material in the next paragraph of Haag starting at page 21, line 12, refers to cracking activity in the conversion of a list of materials including olefins. However, hydrocracking or the use of hydrogen would not be involved here. This is evident from the following sentence in Haag which starts: "The activated catalysts produced by the instant invention may also be used in hydrocracking, alkylation . . ." (Emphasis added). Thus, Haag discloses here, cracking which may involve a number of feedstocks including olefins and, separate from this, other processes including hydrocracking. As recognized in page 3 of the Final Rejection, Haag does not disclose the olefin content of the feedstock as set forth in each of independent claims 1, 22 and 30. The comments found here as to what one of ordinary skill in the art would "expect" does not address the issue presented by a rejection under 35 USC 103. The issue under 35 U.S.C. § 103 is one of obviousness of the claimed subject matter to one of ordinary skill in the art. Such obviousness cannot be established by a mere assertion of obviousness. Similarly, obviousness cannot be established by a mere assertion that feedstocks containing any amount of olefins would yield similar results. There is simply no basis in the prior art of record in this application to support the Examiner's position taken here. A mere assertion of obviousness, without factual support in the prior art as to why the invention is considered to be obvious, is not sufficient to support a rejection under 35 U.S.C. §103. Thus, in *In re Cofer*, 148 USPQ 268 (CCPA 1966), the court stated at page 271:

> "Necessarily it is facts – which must support the legal conclusion of obviousness under 35 U.S.C. § 103. Merely stating that a compound or composition is obvious, without adequate factual support, is not sufficient."

Here, as in *In re Cofer*, the rejection based upon Haag amounts simply to a statement that the invention is obvious without giving facts other than those found in applicants' specification, in support of this conclusion.

Attention is also respectfully invited to MPEP § 2143.01 (Rev 3, 2005), which states in the third paragraph:

> "Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references themselves or in the knowledge generally available to one of ordinary skill in the art."

Here, the only basis for modifying the reference to provide cracking of an olefin-rich feedstock containing from 10-100 wt.% olefins is found in applicants' specification and not in the prior art. The material found in Haag at page 23, lines 5-26, refers to two different types of conversion, cracking in lines 5-15 and hydrocracking in lines 15-26. As noted previously, hydrocracking is carried out with respect to petroleum fractions involving saturated aliphatic compounds and aromatic compounds. Hydrocracking is not commonly understood to involve a process involving the cracking of olefin-rich feedstocks.

<u>Claims 2, 3, 23 and 24</u>

In regard to claims 2, 3, 23 and 24, appellants respectfully submit that the claimed hydrogen partial pressures cannot be found in Haag since, as noted above, Haag clearly does not disclose the use of hydrogen in an olefin cracking process. Hydrocracking is, of course one of many reactions disclosed in Haag, and as noted above, hydrocracking does not involve the cracking of an olefin-rich feedstock containing 10-100 wt.% olefins.

Claims 16, 17, 18 and 19

With respect to the olefin partial pressures found in claims 18 and 19 or the temperatures found in claim s 16 and 17, appellants would respectfully submit that the very broad ranges found in Haag, and even then not in respect of an olefin cracking process, do not anticipate or render obvious the very narrow ranges, such as the temperature range of 540-580°C set forth in claim 17. In regard to the disclosure in Haag of a range of about 400°F (204.4°C) to about 1000°F (537.7°C), it is noted that this range is further characterized as "preferably from about 500°F (260°C) to about 850°F (454.4°C). Both of the ranges disclosed in Haag are below applicants' range, and the upper limit of this preferred range in Haag is far below the preferred range of 540-580°C involved in applicants' process. Thus, Haag not only fails to disclose or render obvious appellants' range of 540-580°C, but also Haag actually teaches away from this range and the broader range of 500-600°C. With regard to this claim and other claims in which the Examiner takes the position that a very broad range found in the prior art would necessarily anticipate or render obvious a narrow encompassed range called for in a claim, attention is respectfully invited to Section 2131.03 MPEP, page 2100-80 (Rev. 3, 2005):

> When the prior art discloses a range which touches, overlaps or is within the claimed range, but no specific examples falling within the claimed range are disclosed, a case by case determination must be made as to anticipation. In order to anticipate the claims, the claimed subject matter must be disclosed in the reference with "sufficient specificity to constitute an anticipation under the statute." What constitutes a "sufficient specificity" is fact dependent. If the claims are directed to a narrow range, the reference teaches a broad range, and there is evidence of unexpected results within the claimed narrow range, depending on the other facts of the case, it may be reasonable to conclude that the narrow range is not disclosed with "sufficient specificity" to constitute an anticipation of the claims. The unexpected results may also render the claims unobvious.

It would appear that the Final Rejection fails to consider this practice as outlined in § 2131.03. Instead, the position taken in the Final Rejection simply involves a broad assertion of obviousness without any reasoning in support of this position.

In addition to the reasons advanced above, appellants would respectfully submit that dependent claims 5, 12, 13, and 21 recite additional limitations which further establish patentability of these claims over the patent to Haag.

<u>Claim 5</u>

Claim 5 specifies that at least part of the hydrogen employed in the cracking process is recycled from the effluent produced in the cracking process. Clearly, there is nothing in Haag that would render obvious the recycle of hydrogen as specified in claim 5. With respect to claim 5 and also claims 12 and 13, applicants would respectfully submit that the issue of unobviousness must be determined by consideration of what is found in the prior art, and against this background, applicants would respectfully submit that a mere assertion of obviousness without factual support is not sufficient to support a rejection under 35 U.S.C. § 103. In this regard, attention is respectfully invited to the previous reference to *In re Cofer* and MPEP § 2143.0.

> Necessarily it is facts . . . which must support the legal conclusion of obviousness under 35 U.S.C. § 103. Merely stating that a compound or composition is obvious, without adequate factual support, is not sufficient.

With respect to the arguments regarding optimization the paragraph at the top of page 4 and on page 6 of the Final Rejection, appellants would respectfully submit that the issue presented under 35 U.S.C. § 103 is not one of optimization, but one of obviousness to one skilled

in the art. As stated in MPEP § 2144.05II(B), under the heading, "Only Result-Effective Variables can be Optimized":

> A particular parameter must first be recognized as a result-effective variable, *i.e.*, a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation.

The simple fact is that there is nothing in the prior art references to support the proposition that only the routine experimentation of a prior art recognized result-effective variable is involved. Further, appellants would respectfully submit that the Examiner has provided no basis in the prior art for the position taken regarding the optimization of the cost of raw materials.

<u>Claim 21</u>

With respect to claim 21, as acknowledged on page 4 of the Final Rejection, Haag does not even address the subject of dienes. The fact that Haag fails to discuss the significance of the diene concentration of the feedstock does not in itself provide a basis for a finding that it would be obvious to remove dienes from such a feedstock. In any event, as is noted previously, Haag clearly is not at all concerned with the cracking of an olefin-rich feedstock in the presence of hydrogen.

Further with respect to this and other issues which the Final Rejection fails to address, but instead relies upon the proceedings in the parent application, appellant's would again note that the claims here and the issues presented in this appeal are significantly different than those in the parent application. As to the subject of the disclosure found in page 5, lines 19 – 30 of applicant's original specification, this material was cancelled in the Preliminary Amendment attendant to filing of this application, thus, avoiding any inference of an admission as discussed in more detail in the remarks accompanying the Preliminary Amendment. It is respectfully

submitted that rejections here should be considered with a view to the claims and disclosure as found in this application and not in the parent application.

The rejection under 35 USC 103(a) of claims 6-11, 14, 26-29, and 31-35 as unpatentable over Haag in view of Colombo

It is noted that the proposed combination of references, even if made exactly as proposed in the Final Rejection, does not cure the deficiency observed above with respect to the use of hydrogen. Colombo, like Haag, does not disclose the cracking of an olefin-rich feedstock in the presence of hydrogen.

Claims 10 and 11

In reference to claims 10 and 11, appellants would respectfully submit that the proposed combination of Haag and Colombo to arrive at the use of silicalite or a catalyst having a silicon/aluminum atomic ratio of at least 180 can be made only with the benefit of a hindsight after reviewing applicants' disclosure. It will be recalled that Haag discloses the use of a large number of ZSM zeolites which have relatively low silica/alumina mole ratios. Haag in pages 5 and 6 calls for the use of zeolites having a silica/alumina mole ratio of at least about 12 and specifies that it is preferred to use zeolites having higher ratios of at least about 30. Haag goes on to exemplify such higher silica/alumina ratios as being "about 70" (page 28, line 28, and page 32, line 24) and gives further examples, such as in Example 15 which can be calculated to be about 53. These are all silica/alumina mole ratio which must be divided by 2 to arrive at the silicon/aluminum atomic ratio. Thus, the highest ratio in terms of the silicon/aluminum ratio appears to be a calculated ratio of 35 as found in Examples 4 and 8. Against this teaching in Haag, applicants would respectfully submit that to replace the Haag zeolites with silicalite or

other molecular sieves having a silicon/aluminum atomic ratio of at least 180 would be possible only in hindsight after a consideration of appellants' disclosure. One of ordinary skill in the art would not, viewing only the Haag and Colombo references, attempt to replace the zeolites in Haag which have appreciable aluminum contents with the silicalites in Colombo which have no aluminum content, *i.e.* a silicon/aluminum ratio of infinity.

Claims 6 – 9 and 26 - 29

With respect to claims 6-9 and 26-29, appellants note the comments found on page 5 of the Final Rejection that ethylene and other high olefins are present in the product of the Colombo patent. However, appellants' claims specify the addition of ethylene to the feedstock, and this clearly is not disclosed in either Haag or Colombo. In regard to the material found at page 3, lines 28-30, of Colombo, this appears to be a negative teaching in Colombo. This paragraph starting on line 18 of page 3 and carrying over to page 4 actually involves the disclosure of a process incorporating an oligomerization step in order to avoid recycle of C_4 olefins unreacted or formed during the reaction. Further, appellants would respectfully note that such olefins would by no means necessarily include ethylene.

Claims 7 and 28

In any case, there is nothing in the references which would render obvious the recycle of ethylene to the feedstock as required in claims 7 and 28. Further, the proposed combination of references would not lead one of ordinary skill in the art to the separation and recycle procedure of claim 28 involving, in addition, the recycling of C_5 olefins to the feedstock.

Claims 14 and 31

In regard to appellants' dependent claim 14 and also independent claim 31, it is noted that Colombo does not disclose a propylene yield on an olefin basis of 30-50% based on the olefin content of the feedstock. As shown in Fig. 1 of Colombo, the propylene is necessarily substantially less than 30% based upon the conversion data and the selectivity to propylene data presented in Fig. 1. To the extent that Table 4 of Colombo may be relied upon, the average propylene yield across the six examples reported there would appear to be well below a propylene yield on an olefin basis of 30%. If one of ordinary skill in the art were to attempt to modify the teachings of Haag to provide certain propylene yields based upon the data shown in Table 4, the results would be propylene yields less than 30%, similar to the data presented in Fig. 1 of Colombo. Further, appellants would respectfully submit that the question posed under 35 U.S.C. § 103 is not whether one of ordinary skill in the art could selectively pick out portions of the references in an attempt to combine them after reading appellants' disclosure. Instead, the issue is whether one of ordinary skill in the art would find the claimed process obvious in view of the prior art without the benefit of hindsight afforded by referring to appellants' disclosure.

In addition to the distinctions discussed above with respect to Haag or Haag combined with Colombo, appellants would respectfully refer to the following claims which, as discussed below, recite subject matter not rendered obvious in view of the prior art references.

Claims 25, 26 and 27

Claim 25 further specifies that the olefin content of the effluent is ±10% of the olefin content of the feedstock. Claim 26 calls for the feedstock to contain olefins of 4 or more carbon atoms and, as discussed previously, further recites that ethylene is added to the feedstock prior to its introduction into the reaction zone. Claim 27 depends from claims 26 and specifies that a

stream of C_5 or greater olefins are added to the feedstock prior to its introduction to the reaction zone. The foregoing subject matter is not found in Haag (claim 25) or the combination of Haag and Columbo (claims 26 and 27).

Claim 28

Claim 28 is directed to the procedure shown in appellants' Fig. 5 and the attendant text at page 30, line 27, through page 31, lines 7, in which the effluent from the reaction zone is applied to a separation zone to recovery a light fraction of ethylene and a heavier fraction of C_3-C_5 olefins, with recycle of the ethylene and the C_5 olefins to the feedstock. Claim 29 depends from claim 28 and specifies that the ethylene recycled to the feedstock contains hydrogen. No matter what construction one might place on the Haag hydrocracking procedure, this subject matter is not found in or rendered obvious by the prior art. The reference in the Final Rejection to *In re Marsheck*, 168 USPQ 721 is noted. However, the decision there is obviously fact-intensive based upon the claimed subject matter and the prior art involved in that case and has no applicability to the situation here. In *Marsheck*, a claim directed to olefin disproportionation in series connected zones with recycle of unconverted feed to the first zone was found to be obvious in view of a reference directed to olefin disporportionation in a plurality of zones with recycle to the "appropriate" zone. There is no analogous disclosure in Haag.

Claims 32 and 33

Claims 32 and 33 depend from claim 31 and specify an MFI-type catalyst having a silicon/aluminum atomic ratio within the range of, respectively, 300-500 and 300-480. The prior art references, no matter how combined, would not result in the use of an MFI-type catalyst having a silicon/aluminum atomic ratio within the relatively narrow confines called for in these claims. With respect to these claims, attention is respectfully invited to appellants arguments

earlier in this brief addressed to claims 10 and 11. For the reasons stated there, the combination of Haag and Coombo would not establish obviousness of claims 32 and 33.

Conclusion

For the reasons set forth above, Appellants respectfully submit that all of the claims herein are patentable over the prior art. Accordingly, it is respectfully requested that the Final Rejection of the claims be reversed.

Respectfully submitted,

William D. Jackson
Registration No. 20,846

February 12, 2007

Schultz & Associates, P.C.
One Lincoln Centre
5400 LBJ Freeway, Suite 1200
Dallas, Texas 75240
Telephone: 214/210-5931
Facsimile: 214/210-5941

Claims Appendix

1. A process for cracking an olefin-rich hydrocarbon feedstock which is selective towards light olefins in the effluent, the process comprising contacting a hydrocarbon feedstock containing olefins in an amount within the range of 10 to 100 wt.% having a first composition of one or more olefinic components with a crystalline silicate catalyst to produce an effluent having a second composition of one or more olefinic components in which the olefin distribution is different from the olefin distribution of said feedstock, the feedstock and the effluent having substantially the same olefin content by weight therein wherein the olefin content of the effluent is within ± 15% of the olefin content of the feedstock, adding hydrogen to the olefin-rich feedstock prior to contact of said feedstock with said crystalline silicate catalyst to provide for the olefin-rich feedstock contacting the catalyst in the presence of hydrogen for enhancing the stability of the catalyst.

2. A process according to claim 1 wherein the hydrogen partial pressure is up to 7.5 bar.

3. A process according to claim 2 wherein the hydrogen partial pressure is from 0.1 to 5 bar.

5. A process according to claim 1 wherein at least a part of the hydrogen is recycled from the effluent.

6. A process according to claim 1 wherein ethylene has been added to a C_4+ hydrocarbon feedstock.

7. A process according to claim 6 wherein at least a part of the ethylene is recycled from the effluent.

8. A process according to claim 6 wherein the ethylene comprises from 0.1 to 50 wt.% of the hydrocarbon feedstock.

9. A process according to claim 6 further comprising recycling at least a part of C_5 or greater olefins from the effluent to the feedstock.

10. A process according to claim 1 wherein the catalyst comprises silicalite.

11. A process according to claim 1 wherein the catalyst has a silicon/aluminum atomic ratio of at least 180.

12. A process according to claim 1 wherein the feedstock comprises a light cracked naphtha.

13. A process according to claim 1 wherein the feedstock comprises a C_4 cut from a fluidised-bed catalytic cracking unit in a refinery, or a C_4 cut from a unit in a refinery for producing methyl tert-butyl ether or a C_4 cut from a steam-cracking unit.

14. A process according to claim 1 wherein the catalytic cracking has a propylene yield on an olefin basis of from 30 to 50% based on the olefin content of the feedstock.

16. A process according to claim 1 wherein the feedstock contacts the catalyst at an inlet temperature of from 500 to 600 °C.

17. A process according to claim 16 wherein the inlet temperature is from 540 to 580 °C.

18. A process according to claim 1 wherein the feedstock contacts the catalyst at an olefin partial pressure of from 0.1 to 2 bar.

19. A process according to claim 18 wherein the olefin partial pressure is around atmospheric pressure.

20. A process according to claim 1 wherein the feedstock is passed over the catalyst at an LHSV of from 10 to 30 h^{-1}.

21. A process according to claim 1 wherein the feedstock has a maximum diene concentration therein of 0.1 wt.%.

22. A process according to claim 1 wherein said feedstock contains 50 wt.% olefins.

23. A process for cracking an olefin-rich feedstock which is selective to light olefins in the effluent, comprising:

supplying an olefin rich hydrocarbon feedstock containing from 10 to 100 wt.% olefins into a reaction zone which contains a crystalline silicate catalyst of the MFI family which is effective for the cracking of the olefins;

supplying hydrogen to said reaction zone at a hydrogen partial pressure of not more than 7.5 bar whereby hydrogen is added to the olefin-rich feedstock prior to supplying said olefin-rich feedstock into said reaction zone to provide that the olefin-rich feedstock contacts the catalyst in the presence of hydrogen to enhance the stability of the catalyst;

operating of said reaction zone at temperature and pressure conditions effective to cause cracking of olefins in said feedstock to produce olefins which are lighter than olefins in the feedstock; and

recovering an effluent from said reaction zone which has an olefin content by molecular weight within ± 15% of the olefin content of the feedstock and which has a lower average molecular weight than that of the olefin content of the feedstock.

24. The process according to claim 23 wherein the hydrogen partial pressure is within the range of 0:1 to 5 bar.

25. The process of claim 23 wherein said effluent has an olefin content which is within ± 10% of the olefin content of the feedstock.

26. The process of claim 23 wherein said feedstock contains olefins having four or more carbon atoms and wherein ethylene is added to the feedstock prior to the introduction of said feedstock into said reaction zone.

27. The process of claim 26 wherein a stream of C_5 or greater olefins is added to the feedstock prior to the introduction of the feedstock into the reaction zone.

28. The process of claim 23 further comprising supplying said effluent to a separation zone and operating said separation zone to recover a light fraction containing ethylene and a heavier fraction containing $C_3 - C_5$ olefins, recycling ethylene in said light fraction to the feedstock prior to the introduction of the feedstock into the reaction zone and recycling C_5 olefins in said heavier fraction to said feedstock prior to the introduction of said feedstock into said reaction zone.

29. The process of claim 28 wherein the ethylene recycled to said feedstock contains hydrogen.

30. A process according to claim 23 wherein said feedstock contains 50 wt.% olefins.

31. A process for cracking an olefin-rich feedstock which is selective to light olefins including propylene in the effluent, comprising:

supplying an olefin rich hydrocarbon feedstock containing from 10 to 100 wt.% olefins and containing one or more olefins of C_4 or greater into a reaction zone containing a crystalline silicate catalyst which is effective for the cracking of the olefins;

supplying hydrogen to said reaction zone at a hydrogen partial pressure of not more than 7.5 bar whereby hydrogen is added to the olefin-rich feedstock prior to supplying said olefin-rich feedstock into said reaction zone to provide that the olefin-rich feedstock contacts the catalyst in the presence of hydrogen to enhance the stability of the catalyst;

operating said reaction zone at temperature and pressure conditions effective to cause cracking of olefins in said feedstock to produce olefins which are lighter than olefins in the feedstock and to produce a propylene yield within the range of 30 to 50 wt.% based on the olefin content of the feedstock; and

recovering an effluent from said reaction zone which has an olefin content by weight within ± 15% of the olefin content of the feedstock and which has a lower average molecular weight than that of the olefin content of the feedstock, said effluent containing propylene in an amount within the range of 30 to 50 wt.% of the total olefin content of the feedstock.

32. The process of claim 31 wherein said crystalline silicate catalyst is an MFI-type catalyst having a silicon/aluminum atomic ratio within the range of 300-500.

33. The method of claim 32 wherein said catalyst has a silicon/aluminum atomic ratio within the range of 300-480.

34. The process of claim 31 wherein said reaction zone is operated at an inlet temperature within the range of 500-600 °C and an olefin partial pressure within the range of 0.1–2 bars.

35. The process of claim 31 wherein said feedstock contains greater than 50 wt.% C_4 as an olefin.

Serial No. 10/719,267
31223.00020
F-756CON

PATENT

EVIDENCE APPENDIX

Evidence submitted pursuant to 37 CFR §1.130, 131, 1.132 relied upon by appellant in this appeal: None.

Evidence relied upon by the Examiner in rejecting the claims:

Haag European Patent 0034444 – attached

Colombo et al. European Patent 0109060 – attached

Related Proceedings Appendix

Copies of the Decisions on Appeal in the following applications are attached.

Application Serial No. 09/594,059, Abandoned

Application Serial No. 09/206,210, now Patent No. 6.713,658

Application Serial No. 09/205,559, Abandoned

Application Serial No. 09/206,207, now Patent No. 6,645,175

Application Serial No. 09/206,208, now Patent No. 6,646.176

Application Serial No. 09/206,218, now Patent No. 6,951,968

Application Serial No. 09/206,216, now Patent No. 7,087,155

Application Serial No. 09/596,356, Abandoned